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ABSTRACT

Noting that interviews with preschool children can yield invaluable information regarding children's thinking and knowledge, this book presents information for preschool and primary school practitioners on an extension of Piaget's clinical interview method and provides examples of the process, analysis, and conclusions from interviews with young children. The book begins with a rationale for conducting interviews with children, notes that interviews can result in insights regarding children's perspectives on learning and their comprehension of the surrounding world, and suggests ways adults can use such insights in instruction. The book continues with detailed information on conducting interviews, including practical arrangements, using of group or individual interviews, questioning techniques, following up a question, and being an active conversation partner. Information and examples are presented regarding interpreting children's interviews, including information on reliability. The use of information obtained from children's interviews for evaluation planning and parental involvement is illustrated. The book also provides tips on using available time for conducting interviews. The book concludes with a discussion of children's interviews within a wider perspective and considers the potential clash between scientific thinking patterns developed at school and everyday thinking, children's spontaneous questions, the teacher's role, and cooperation between the preschools and other practitioners. Contains 37 references. (KB)

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ELISABET DOVERBORG
INGRID PRAMLING

TO UNDERSTAND CHILDRENS THINKING

METHODS FOR INTERVIEWING CHILDREN

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Reports from
Department of Methodology
UNIVERSITY OF GÖTEBORG
No. 5

TO UNDERSTAND CHILDRENS THINKING

Methods for Interviewing Children

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Preface

Much of what we have written in this book *about* children has been learned *from* the children themselves, through experiences in both pre-school and teacher training.

Our interest in children's thinking began during the time we worked as pre-school teachers with children of various ages. We often reflected about what children really understood about their work. Sometimes we thought that children had misunderstood what we were teaching. They answered us and commented on their experiences in ways we had not intended or expected, showing us that they had not understood our intentions. We have also worked for a number of years as teachers at the college for pre-school and leisure centre teachers, visiting hundreds of pre-schools and leisure centres in the process, as well as some primary school classes. Although we did not have as deep a relationship with the children we visited as with the children in our own groups, we experienced time after time how children and teachers had understood the same situation in an entirely different manner. We became more and more interested in and attentive to what children gave expression to in their thoughts. We realized that we needed deeper knowledge. This led us to begin our research training in pedagogy, where we came to adjust our understanding of children's thinking, particularly related to learning and mathematics.

The contents of this book are as follows: In the first chapter an argument is presented for understanding the behavior of children in a pedagogical sense. The next three chapters deal with the interview techniques and analyses. After that we discuss the application of the children's interviews in the context of the teacher's working day. In the remaining chapters we discuss observations from a group conversation based interview. The book closes with a short discussion where we attempt to place child interviews in a wider perspective.

We wish to thank a number of people who have read our manuscript and given us valuable suggestions about the contents of

the book. We especially want to thank professors Ference Marton and Claes-Göran Wenestam, methods instructors Anita Eklöf and Margit Anevret, child care assistant Anita Stålbäck, education secretary Agneta Thorin, communications teacher Eva Delin, pre-school supervisors Birgitta Sjöqvist, Lisbeth Ögren, Eva Josefsson and Nomi Mortsell, and pre-school teachers Gunilla Bergquist and Marie Tohrberg. A warm thank-you also to Maj Asplund Carlsson and Karin Delin for their help with the format of the finished manuscript. And last but not least we thank all the pre-school teachers who allowed us into their children's groups as well as all the children who so willingly shared their thoughts with us.

Preface to the English Version

Sweden has been praised across the world for the quality of both its early childhood programs and the support given by the state for these programs. It has also served as a model for social legislation which supports the family with lengthy parental leaves with only a slightly reduced salary for one parent when a baby is born, parental leave with pay when children are sick, state "child-benefit" subsidies, lengthy vacations so that families can enjoy leisure time together, good housing standards and adequate medical care for all people. In addition there are laws which prohibit spanking and other abuse of children as well as equal opportunity legislation for women and other disadvantaged groups. A strong program for teaching immigrant children includes both Swedish and their own native language, so they can function and become part of Swedish society, and at the same time maintain their cultural roots and identity.

Before turning to some introductory comments about this book, a brief description of early childhood programs in Sweden needs to be given. One- to seven-year-old children who are not at home with their parents are largely served either by child care centres or by child minders and open pre-schools. We will deal with these briefly here.

Child care centres are public institutions which are mainly heavily subsidized by the government. They serve children aged between 1 and 7 years in age-integrated groups. A queue system operates in each municipality to allocate places to the centres, but children with special needs are given preferential placement opportunities. Family day care providers are used by municipalities to cover parents needs where child-care centres are not available in sufficient numbers. Day-care providers serve up to five children in their homes and are paid by the municipality regardless of child attendance patterns. Day care provision of this kind is usually given in conjunction with open pre-schools. These are available to both family day care providers and parents who stay at home with their children. At these pre-schools there are materials, activities,

and opportunities for adults who care for children in their home to meet and engage in discussion and conversation. A few parent co-operatives and even fewer privately sponsored early childhood programs are emerging.

From the age of six years and upwards, different facilities for day care are available. Six-year-old children are served by half-day pre-school programs which are very much like the half-day kindergarten programs in the USA and in some senses infant school reception classes in the UK. This form of pre-school is in itself a day care facility. Children who attended child care centres or received family day care provision prior to commencing pre-school continue to do so during the remainder of the day. Seven-year-old children begin compulsory school in Sweden, which is like the elementary school in the United States, but they usually need some form of day care outside of school hours. There are two ways of providing this and the leisure centre is one of these. Leisure centres provide child day care for children between 7 and 12 years of age, both before and after school if necessary.

This book addresses some curriculum relations of early childhood education in pre-schools, the lower compulsory school, and the leisure centre. Expanding upon Piaget's interview process, the book also describes a rationale for conducting interviews with children and suggests ways to analyze them. Furthermore, it describes how interviews can be used for both evaluation and instructional purposes to develop coherence and continuity between the different levels of education, a major concern among educators in Sweden today.

Written by Helen L. Carlson, PH. D., who also made the first draft for the translation of this book.

"Understanding children's thinking" was first published in Swedish in 1985.

Introduction

Through our research, we have come to understand part of children's thinking - an understanding that would have been of great value to us in our work as pre-school teachers. Throughout the book we will therefore attempt to teach pre-school teachers, leisure centre leaders, child care workers, primary school teachers, and teacher candidates about the necessity and pleasure of learning to interview children. The aim is to contribute new information to teachers and help them learn to understand more about the "children's world". We hope that through our examples, teachers will be able to improve their work with children. Our purpose is also to write an example of the process, analysis, and conclusions of the type of interview which we believe can be used by individual teachers to help them in their daily work.

The type of interview which we write about is similar to a conversation between children and adults. The aim is for children to disclose as much as possible about their ways of thinking and the contents of what they know. When we use "contents" we do not mean content in the traditional sense; we mean the theme, composition, elements or material of knowing or the experience of events, activities, notions or ideas. The method of working is an extension of Piaget's clinical interview method[1] and has an underlying character similar to the procedures used in some research processes. Writing examples about the interview process, analysis, and conclusions demands that one be accurate, systematic, and representative. Teachers do not need to regard all of these factors when carrying out interviews.

Adapting the program to children

Adapting methods and materials to children's levels of development and learning will be discussed in relation to both pre-school[2] and primary school programs[3].

The children who come to the pre-school are at different levels of learning development, which makes an enormous difference to the exchange of information there. According to legislation, children should be given new learning experiences in pre-school, but the execution of rules and regulations depends on how the work is seen in different children's groups. In school, children again meet a new reality which gives them new learning experiences. School legislation states that teachers should attempt to adapt instruction to the children's levels of development. To make both sets of school policies work, we must learn a way of knowing how children perceive their world.

There are different ways of understanding children's thinking and learning, and the nature of the information the teacher receives about children depends on which methods are used to gather this. This also applies to the form of the interview. Understanding children's thinking can be of great value for the teacher in her work with co-operation, planning, and evaluation, and directly affects her own competence related to the children, both younger and older. Observation has long been used as a conventional way to describe the learning of pre-school children. Tests and examinations have been used when evaluating primary school children. We wish to state that these two methods are neither suitable nor sufficient.

Today's talk of co-operation between the pre-school and primary school is often concerned with administration and organization. We believe co-operation should apply to the contents, methods and nature of the work[4]. Children's interviews can play a central role here and can be used to arrive at the contents of children's thinking surrounding central conceptions, principles, or ideas, so that one can create some continuity for them as they move from pre-school to primary school. Children's learning and development should form the primary focus for co-operation, not administrative and organizational needs.

Another good reason for conducting child interviews is that instruction and learning should always begin at the child's own level. In order to plan and prepare work, the teacher should know how children think, including the actual contents of the thoughts. This knowledge can be coupled directly to planning and evaluation

work. To meet children at their levels of development requires that planning and evaluation go hand in hand, particularly if the teacher's own reflected knowledge of her work and of child development are to increase. Here are some examples:

A pre-school had been working with the theme "The Past", and during an appraisal of the theme the teacher asked the children to give some examples. Some of these seemed unusual. One child for instance mentioned an aunt who they used to know and who had recently come to visit them. At another pre-school the theme had been "Respect and Consideration". The teacher introduced the theme with a box of chalk overturned which the children helped pick up and in subsequent days she tried to teach the idea of respect with other concrete illustrations, before on completion of the theme asking the children if they remembered what they had learned. A child turned and looked at the floor and said, "I haven't spilled anything". Examples can also be taken from the primary school. One school had been teaching about temperature. When asked what they had learned about this, one child said that they had learned how to make a thermometer.

Reactions such as the above should lead teachers to begin to wonder if there are some mistakes in their teaching strategies, or if the content is too advanced or maybe irrelevant for the children. Interviews make clear what children think, but they can also be a goal in instruction and in developing continuity between the pre-school and the primary school. Through interviews children are compelled to think and reflect, which in turn affects their learning and development.

A trip into the children's world of thought

All teachers know that children's thoughts and concepts are different from those of adults, but the manner in which children's thinking has consequences for daily work is not so easy to determine. The fascination of the research community with the child's perspective of the world is not easy to translate into the daily practice of teachers.

Modern culture values abstract thinking and we begin to encourage children in this early on. Parents and the surroundings place great importance and promote children's participation in the symbolic world. And the teachers of young children as well as parents know the expectations stated in books and elsewhere - that children must succeed the first time they try an activity. The child's manner of thinking in the early years is concrete and far from the abstract ideal which western societies encourage. But children live in our culture and become socialized in connection with it. What the rewards and encouragements are in other societies are by no means obvious.

Historical studies of adult thinking show that sometimes the same manner of concrete thinking which children express every day was used by adults previously, and for many hundreds of years. This means that through the historical study of the development of thought, we can sometimes come to understand children's development.

Childhood is a cultural phenomena which has interested people in modern times only. Piaget was one of the first investigators to develop scientific knowledge of childhood. He undertook a systematic study of how the world looked from the perspective of children. To learn about the "children's world" is to learn to know wider society and at least a little part of the complex culture in which we live. Irrespective of didactic intentions, a direct application of the interview with children which we want to prescribe, is to learn first about the "children's world". This gives value to our working profession, as it can both help us to help children learn and to learn as teachers.

Why Children's Interviews?

Verbal communication is the most common instructional method, thus, knowledge about this method should be collected and recorded. Every teacher has amusing examples of things that happen, or comments that children make, which in our eyes make the work seem entertaining. But children's comments are not things for amusing adults, for without them the adult could not know how children view their own world. It is what children say or the manner in which they express their thinking that reveals their comprehension of the world in which they live.

Perspective on learning

Pre-school and primary school work should fit children's development; this is one of the areas which we have illuminated in this book. Children learn and develop, but children also develop through what they learn. Learning and development are two parts of the same process which enables children to organize impressions from systematic learning in the form of representations and ideas. These concepts grow in the developmental process as expressions for an organized knowledge independent of the immediate perceptions of an event. Thus we should encourage learning which involves the solving of a problem together with the development of more overarching strategies for problem solving, as a way to develop concepts. This can result in children actively engaging in understanding what happens around them through the exploration and handling of objects in the world[5].

Children learn through their own active involvement. Thus, children who stay in an environment in which there are no challenges to their thinking, risk coming to a standstill in their development. The teachers' task becomes the active organization and structuring of children's experiences in such a manner that children are compelled to think and draw their own conclusions, partly to find the level of a single child's expressions, and partly to help the child widen its thinking. We adults cannot tell children how

they should think, but we can give children concrete problems, where from earlier experience and knowledge they can deal with more advanced problems.

The interview is an instrument for stimulating the thinking ability and learning development of children. Through adults helping the children observe how to manage the consequences of their actions, the children begin to think about things which they had not reflected upon before. Donaldson[6] states that children who have often dealt with questions of the type which compel the child to describe or elucidate something, questions like: "What does this mean?", can see their own role in the communication situation.

Säljö[7], referring to adults, and Francis[8], referring to children, indicate that the significance of what is learnt is related to the personal challenge experienced. Francis described three different categories of children with respect to the relationship between how they understood the school situation and how they learned to read. One group quickly learned to read well. They already had ideas about how to read and write. Another group of children were categorized as slow in learning to read. These children were capable of reading and writing some things in school, but did not see the joy of reading and writing throughout their whole life. The third group of children were very slow in beginning to read. Many children in this group had an obvious problem even after three years in primary school. They could copy the writing in books, but they had no understanding of what they were reading or the meaning of their lives in school.

In Leimars[9] early reading program (Läsning på Talets Grund), a language experience approach, knowledge of the importance of children s understanding of what they are reading, is utilized. LTG builds on children understanding the need to understand the text in order to write it down.

We have reason to believe that the same applies to other learning situations, that is, that children's assumptions about what their whole world is about in relation to their learning is significant for their ability to learn. Many of the problems children face in the context of education are due to the fact that they have not

understood the value of learning in that context, or grasped the suggested task.

One assumption that we have about learning in the pre-school, leisure centre, and primary school, is that it ought to include provision for children's thinking around a central concept, principle, and idea of development, in order to better help children understand and manage the world in which they live. If we want to have children develop their thinking, if we have as a goal for the pre-school program more relevant and advanced or more functional comprehension, we must first know which representations children have as a basis for their thinking in order to help them broaden to their next "thinking level". Thus the central principles, concepts, or ideas which children are meant to learn, ought to form the central goals and guidelines for any education program in their early years.

We need now to give examples of what we mean by more relevant, more advanced or more functional concepts. It is not easy for a child to instantly develop comprehension, even though children believe that they can suddenly learn something new when they get older. One other idea we have about certain children is that they learn through experience. One part of what children understand is not derived through experience, but learning through their active engagement and performance has most significance for them. This leads to relevant comprehension which has elements of practice. It is the use of learning by children themselves that forms their standard before starting school.

Pramling[10] has described how children comprehend learning as either beginning to be able to *do* something, *know* something or *understand* something. The latter is attributed to be the more advanced comprehension which occurs when children have understood that they can not only learn to do things, but that they can also, through learning, gain knowledge about the world and really come to know things. This can be visible in how children solve mathematical problems in functional and less functional ways, even though children have more detailed and complicated ways of calculating than they can perhaps quickly demonstrate when they and the problems become a little more advanced.

The perspective we have constructed about children's learning characteristics in the pre-school, the leisure centre and the primary school demands that we change our ideas. Children think about or understand their world situation in qualitatively different ways. Accordingly, learning is about moving from one level of complete comprehension to another.

Children's comprehension of their surrounding world

A starting point for this book is that children should be able to understand and comprehend the educational situations they are put into, as this kind of experience is the basis upon which their symbolic thinking is developed. We see children's inner development from both a developmental psychological perspective and a pedagogical perspective. Children's presentations must be understood in order that one can come to understand their thinking and know how education influences them by contributing to the formation of their understanding.

In an interview study[11] conducted in Sweden and India, four-year-old children described *what* they learned in pre-school. Many Swedish children stated that they had not learned anything. In the interviews, where children revealed what they learned, they commonly gave examples from social behaviour i.e. not being noisy, not running inside the school building, sharing food fairly at meal-times etc. In contrast, when the Indian pre-school children were asked what they learned, they answered that they learned to read and write.

In Sweden we tend to believe that a child's reading and writing ability does not derive from the structured work of the teacher, but rather develops entirely and wholly from the children's initiative while playing. Swedish and Indian children gave different answers about their upbringing and what they experienced in pre-school. Through the different answers one can see what is important in two different cultures. In the pedagogical situation in India compared with Sweden, children have different experiences. These affect their ways of thinking. A further point we will make here is that different situations have different meanings for children at different developmental levels.

This is true for reading[12], mathematics[13], speaking[14] and working with various materials.[15] The list of examples could be longer, but the essential point is that, whatever the domain, the individuals in a children's group think differently about specific contents. To interview children and become aware of the variations in comprehension provides us with different ways of understanding children's thinking. A child's comprehension does not mirror a stable individual characteristic with a single way to think, but the ways an individual acts and thinks depends on specific situations. This means that the same child may have different levels of comprehension depending on the situation.

The following is an example from Pramling's[10] study where 300 children were asked: "Tell me something about what you have learned?". The children's answers could be classified into three different categories. These represented different ways children think about learning. The early grade children described their thinking in terms of what they had learned "to do"e.g. they said they had learned to ride their bikes, turn somersaults, wash their hands, etc. At another level, children described their learning by naming different bits of information or knowledge, e.g. that they knew that one should not move a dead bird because they might get germs. For these children, learning was represented as "knowing" something. The third level of description was where children described how they had suddenly understood something which they had not done previously, that is, they described an insight into something.

The above description of what children comprehend and say about their learning shows us the variation in children's levels of thinking. The variation can also be seen in a group of eight-year-old children, who had an opportunity to describe what they had learned. The variation in their levels of thinking was similar to that found among the 300 children referred to above. Teachers must be aware that even within a specific age-group, there can be great variations in ways of thinking.

One other example of how children can interpret the same situation in different ways was seen when children in a pre-school worked with the theme "Colour". One day when playing the game,

"A Ship Comes Loaded with Cargo," the children were asked to name the different colours of the cargo. When the children were interviewed about this game, some of them said they played in order to learn the different colours, whilst other children gave another reason i.e. that the teacher had suggested it. Thus you can see a further example of how children think in a specific situation. Certain children understand something beyond the situation, i. e. that they play to learn colours whereas other children comprehend only the situation itself, that is, to play as the teacher directed.

In the same way that there are levels of motor development, there are levels in the development of children's thinking. Motor development is often viewed as being dependent on maturation, but *the development of thought patterns is part of the the wider extension of experience.* The experiences a child has had or opportunities which have been made available have meaning for how he or she thinks. This means that one reason children have different progressions in their thought patterns is they have had different experiences in the real world of the community[16].

The significance of the adults' comprehension of the children's world of thought

When teachers transmit knowledge to children, little is often retained in the children's consciousness, largely because of how the teachers structure their instruction i.e. if it is from the point of view of the adult[17] or not from the child's perspective. In the pre-school, some of the intentions of the early childhood programs[18] have been successful, i.e. that children are sociable and should learn to relate to each other. Because of this, early childhood teachers perform differently than the traditional knowledge mediators in the formal school. They proceed from the children's behaviour and act in concrete situations which arise, playing together with children from within the children's own experiences.

In order to develop a method for learning how and what children think, one must place them in situations where they need to think. Children as well as adults take a lot for granted in their everyday lives. To be able to induce knowledge one must first create order from the full range of impressions obtained by a child. But what is

interesting in connection with instruction is that when the teacher and child arrive at different meanings for things, then communication cannot arise. For if communication between two partners is to function, things must have the same meaning. When adults represent the world only for themselves, without reflection, their representation becomes incomprehensible for children, like when the teacher creates rules and so forth only from her own experiences.

Several examples can illustrate what we mean. A child had fallen in the playground at the child-care centre and hit her mouth making her gums bleed. There were no teachers nearby as they were inside. When the child's mother came, she asked her child why she had not gone in to the teacher. The child answered, "We are not supposed to run into the building when we are playing outside." The teacher was able to separate circumstances and to know that the rules do not apply in all situations, but the child had taken her rules literally and applied them to absolutely every single situation.

A further example can be taken from how the theme of shape is introduced in pre-school through a presentation of the four basic forms, the circle, triangle, square, and rectangle. When children are interviewed after the theme's introduction, and are given an egg or a banana for instance, or any other shape than the four mentioned, they will often believe that these things have no shape. Shapes were only those things that the teacher presented and nothing else. For the teacher, it was evident that the forms she presented were only *examples* of shapes, but many children did not understand this, as the teacher did not make her own understanding clear to the children.

Similar examples can be taken from the primary school. For instance, at the end of the first school year, a group of children were asked the question: "What is the difference between a school reading book and a local history book?" The children identified three aspects. Certain children thought that the books had *different appearances* i.e. that some books were thick and some were thin, some books were large and some were small, and some books contained figures but others had pictures, etc. Other children said that the *contents* of the books differed i.e. that the reading books say things abstractly but that the local history books deal with

reality. Yet another aspect which other children identified was the *function* of the books i.e. that the reading book taught people to read, but the local history book gave facts[19]. When one interviews school children it often happens that they believe that books are there so that one can learn to read, but that the contents are there so that one should learn something that is not so evident.

In the pre-school as well as the primary school children acquire certain knowledge and are prepared for certain experiences. But the power to acquire what are termed the basic school skills builds for the most part on that which comes from within. It is from within that children either get hold of things or arrive at other meanings. These other meanings arise naturally from activities but are something other than what the teacher intended, in which case the teacher must change her original goals. We can illustrate this by looking at how children arrive at conceptions of time.

In the pre-school and the leisure centre as well as the primary school, children learn about time. The teacher's goal is to have the children learn to tell the time in different ways. As a way to do this they use concrete material through which children are involved in working with clocks. When asked what they learn, children often answer: "To work the clock." For these children the inner meaning of what they learned was *to do something*. The goal was that they should learn *to know something* at a more advanced level of comprehension. But many children are not old enough to do this. They are not able to meet the teacher's intention of comprehending something about time, in as much as the basics that they embrace are not adequate at that level. The teacher's intention, that children should work with clocks in order to learn about time, was understood by the children only in terms of what they were working concretely at i.e. making clocks go round. The teacher and the children have different assumptions about what the activities are for. When this kind of thing happens children often fail to grasp the knowledge presented in school.

All instruction rests on certain assumptions, whereas basics are often taken for granted. The more elementary the basics are, the greater the risk that they are not be considered objects for teaching or reflection by children, and this can lead to severe long-term consequences. Teachers must develop the skills to mediate between

child and adult comprehension and know what they really do and why they do it. Working with activities in the appropriate form for school preparation cannot be ignored in the pre-school, and one must naturally follow it up in school.

The effects of understanding the basic process of learning and its purpose can be shown by returning to a study by Pramling[20]. A number of children were asked how they would go about learning the telephone number of a new friend in the pre-school. Many children believed that they could not learn the telephone number by heart and suggested that they should write it down on a scrap of paper. Other children thought that they could memorize the number. They had realized that the basic idea was to learn a telephone number by mentally repeating it until they remembered it. By knowing what was involved in the task and how this related to its purpose, these children were able to resolve the problem.

In the beginning of our interview study, we were often amazed how children had comprehended certain things. We were teachers ourselves, who had always previously taken children's thinking for granted. We had believed that the longer we worked, the clearer the children's answers would be, but they did not seem to answer the questions in the way we thought they would. Unenge[21] says that he reacted the same way when he began to interview children about mathematics. "Can it really be so. Is this in fact the reality of our pupils?" he thought. Many teachers react similarly regarding children's understanding and thinking.

Children quickly see through the expectations teachers have and the answers which satisfy them[22]. One example can be taken from daily life in pre-school. Many pre-schools have a recurring procedure with the calendar every day. Children turn the pages of the calendar and the teacher talks about which month and which day of the week it is, and whose "name-day" it is. Children answer by naming a day that is satisfying to the teacher, but they often have no understanding of what the whole thing is about. The central thing for the children is to turn the pages.

Access to the children's world of experience for the teacher gives a new insight about children and about what to do to help their development and learning. The teacher's most important goal is to

acquire an understanding of the child's perspective in order to be able to adapt instructions to the child's experience. And how does one get this knowledge?

Children's thinking as a point of departure for pre-school work

The main reason why we have interviewed children and analyzed what they have said is to give teachers a basis for their work. The overriding goal is to enable them to be flexible and willing to meet each individual child at his/her level. The teachers must always be willing to improve their teaching. They cannot plan on a once and for all basis and follow that plan year after year, as children's situations in the world vary. This variation has its basis in the children's lives in different environments for different periods of time, where they have different experiences in families, with friends, in the pre-school, in the leisure centre, and in school.

There is valid co-operation between both pre- and formal schooling. This is evident when the outcome of all levels of education becomes a continuity in handling the central forms of children's learning. Children must return to the contents of the basic concepts from the pre-school in the primary school.

The key idea which both pre- and formal schools have is the centrality of children's learning in daily activities. In both settings the aim is that children will understand by becoming actively involved in shaping what they learn. One proven way to do this is to let children plan, carry out and evaluate some activity every day[23]. The teacher's role is to ask appropriate questions and help the children develop their own agenda. In this regard they only restrain children in order to make them more conscious of their role in the learning situation.

Another central concern is how children learn to read, since they are so heterogeneous in their demonstrations of this capability. Great heterogeneity can be dealt with through a philosophy of individual learning now found in the pre-school. Through co-operation between teachers, ways of working can be arrived at so that children can come to understand that they can work with the same things at different levels and need not always work with

different things to attain different skills and competences. With specific regard to reading skills, children need first to gain an idea about what it means to learn to read.

We have given an example earlier in the chapter about how different children comprehend and think differently in education settings. Children's thinking reveals what children must receive support and help from the teacher to realize their own development. The primary school must proceed where the pre-school leaves off *for every single child*, in order that the complete meaning of a situation is made clear to the child, and that nothing is done for which they have not a comprehensible grounding for developing their understanding further. The children's work in the pre-school, the leisure centre, or the primary school must be meaningful to them. Motivation is a vital factor in all learning, and it is hard to visualize a situation in which a child has great motivation to do something which the adult said he should do, if the child sees no meaning in it.

Interviews with children in the pre-school reveal that children believe that they have to be able to read before starting school. Indeed one can often sense the alarm some children feel when they know that in only a few months school will start, and they do not yet know how to read. Interviews with children in the primary school or the leisure centre show other things of importance. Children may not have learned to read, but will have come to know that in school they should sit still for instance. They have learned in other words that they have to follow this and other rules. Teachers know this but perhaps don't know how such representations arose and what earlier experiences children have had. Co-operation could help them to help children to other experiences which might influence their thinking in a more positive direction. We have to interpret what leads children to react to certain conditions in certain ways, in order to positively develop the experiences they get from what we try to give them.

How to Interview Children

In an interview situation it is not only the questions and their phrasing which influence what can be obtained. Just as important is the contact created with the child, for without the child's willingness to work together with us we cannot learn anything from him/her. We shall point out certain external circumstances which affect the interview situation, irrespective of whether it involves an interview with a single child or with a group.

Practical arrangements

The first practical step in the arrangement of an interview is to secure a *quiet setting* so that the child will be able to concentrate and not lose interest. It is unsuitable to use a school staffroom or an entrance hall etc., where adults come and go continually. We have found it hard to interview in such places. They often cause both children and adults to either clam up or loose concentration when interrupted by a third person's presence. Another area which can greatly interrupt children's concentration is near the playground where they can see their friends at play.

What is necessary as far as the practical arrangements are concerned is to have a *tape recorder*, and *all the materials you will use* in place. The interviewers themselves must be familiar with the tape recorder as well as the materials which they need for the interview. There are many possibilities to shape and to keep up the contact which the interviewer and child must have with each other. In order to maintain the child's interest, *eye contact* should be made throughout the whole interview. Interviewers should know the questions they will ask ahead of time so that they will not have to shuffle through their papers. Staring at the child is also not recommended.

We have found that we always need to use a tape recorder because it is difficult to take good notes at the same time as the interview is in progress. For analysis, it is necessary *to record the whole*

interview. When one does not use a tape recorder but tries to take notes about what the children say, they talk so quickly that only a part of what they say is written down. Consequently, important information may be missing when one begins the analysis.

During the interview the child also reveals important things through gestures, mimicking, or pitch of voice. Observations of *body language* and behaviour should be noted down immediately after the interview is finished. This helps the interviewer to understand better what the children were saying in the interview, when the material is interpreted at a later time.

The time of day for the interview is also important as certain times of the day are better than others. A child who is bored, hungry, waiting to go to or interrupted in play is always more difficult to motivate than a child who is not tired or not involved in play, etc. It is also important to have allowed *sufficient time* for the interview so that one does not hurry the children or make them feel stressed. Children should be collected for the interview rather than sent for.

The best length of an interview depends on several factors: the age of the child, the interest of the child and the level of participation of the child in the interview situation. The interviews we have conducted with children between three and eight years of age have ranged from five to thirty-five minutes in length. The time difference depends naturally on how young the child is, since young children do not have the experience and language capacity of the older children. Likewise, younger children tire more quickly than the older children so the interview cannot go on as long.

Social contract

Even if one has taken into consideration the things that make good practical arrangements, the interview will not be good unless a relationship is developed which builds the children's confidence. Teachers who interview children from their own classes have a clear advantage, for they have already established positive relationships. However, when interviewing a group of children it is important to know the children's environment, as well as the

children themselves. Contact with the children can be helped by the teacher giving information to the children before the first visit.

The information collected from children will depend on the social contract established. Good contact with the children can be secured if one can anticipate what they will talk about and about which things they will share their thoughts. But they must feel secure enough to do this. If the children do not have confidence at the interview, they are likely to be more reserved in their statements. To shape and establish a social contract, which builds on reciprocity in the relationship, presupposes that the interviewer concentrates on what the child has to say.

It is hard to plan how many interviews to conduct in a day. It depends partly on the nature of the interviews, which we will come back to later, and partly on the time one must spend when one arrives to get an overview of the situation. In the contacts with individual children, it makes it easier if one has an idea about what one can converse about. The children's engagement in the day's activities also affects how many interviews can be done. With interviews, one must therefore respect that Lisa must finish putting together her puzzle or that Todd will miss his maths assignment if he is in the interview. It also follows that the children will concentrate better if the interviewer has respect for their normal activities.

Children will not always answer certain questions. This we must respect. Maybe the child is emotionally deeply affected by the question and will not answer it. As an example, on one occasion a child answered a question as follows: "Tell me something that you know". "No, Mummy told me not to." While it is important to follow-up questions, we must be sympathetic and not press the child. In this case it is likely that there was something which the child's mother had said he should not mention. One must be conscious of how the contents of the interview can be positive or negative to the child. This influences the contact and conditions surrounding the conversation. Here one would be sensitive to a situation in which there is a degree of conflict and not talk about it. Children may reveal defence mechanisms which results in them not being clear about the answer, for they may suppress what is disagreeable.

To respect the child and the child's feelings is of primary importance for building up a positive relationship between the interviewer and the children. This relationship is based on how one handles the first contact with the child. And therefore it is important to let the children know how important they are early in the first meeting with them, i. e. that one has selected them specifically and that one will talk with each one of them. In order to emphasize the importance of what the child says, we tell the children that their conversation will be recorded.

In order to build a good conversational situation, one must also tell the children what the conversation will be about and why it is taking place in a special room. If the mutuality of the conversation is to be preserved, the interviewer must listen intensely to what the child has to say. Nodding in approval, smiling and humming etc. gives the impression that one is really interested in the child. The aim is to be sensitive to what is suitable and to stop questions when the children cannot answer or have not thought about a particular topic. It is necessary to be aware that sometimes the children cannot give answers to the questions prepared or they can suddenly become exhausted. One must respect that the child is exhausted at that moment, but that she probably will be able to continue the next day.

A sensitivity for how long the children have the strength to work together is of great importance. Maybe the following interview situation can form an example showing the lack of that sensitivity in our interviewer. At the end of interview situation a child answered the question:

Teacher: *Can you tell me something more about what you want to know?*

Karl: *Yes, when can I leave here?*

(In all quotations, the term teacher is used. The children's names are fictional.)

When the interview is completed it is important that the child shall be given time to listen to the recorded conversation. This is something that the children appreciate very much.

We believe that the interviewer develops a sensitivity for the children and uses empathy in order to motivate, to respect, to

listen, and to know when they should go on to a new question or even end the interview. One can't get away from the fact that the interviewer has an advantage over the child. On the contrary, the interviewer surrenders to the children's will to share their own thoughts.

Individual or group interviews?

The decision whether to conduct an interview with a child alone or in a group must be based upon what one wants to get out of the interview. If one wants to know about how a single child thinks about or understands a certain phenomenon, then a one to one interview is appropriate. If one is interested in how a group of children think about and understand a particular phenomenon, then a group interview is preferable.

In a group interview, children's answers can give sources for new questions and thoughts about each others ideas.

When we interview children, we must be conscious of group mechanisms. Are quiet children able to participate in the conversation? How much should the talkative child talk? Children are also often contrite to place visiting adults into a typical teacher role and one must be aware of what that can mean.

The advantage of the group interview is that children can become conscious of different thoughts and understandings and that they come to understand new things through hearing their friend's descriptions. This can lead to children coming to understand one thing or another that they had not understood earlier.

Unenge[21] gives an example from a group interview in a maths class. The children's assignment is to calculate the cost of four kilos of potatoes when six kilos cost nine crowns. The conversation develops as follows:

Teacher: *Anna, what do you say?*

Anna: *Six crowns.*

Teacher: *And how do you know that?*

Anna: *Yes, six kilos cost nine crowns and if I divide six by nine, what did I say, nine by six, and*

that becomes one and one half, or one and fifty.

Brita: *What?*

Anna: *Yeah, six into nine goes once and there are three left over and three is half of six and..*

Brita: *Oh yeah, I understand...*

We see here how Brita understood a calculation assignment through her friend talking about how she thought out her answer. This is an example of how a group interview can serve as a model in teaching the development of children's thinking. But the children's development of calculating skills does not come merely through listening to each other. It also demands an active engagement from the teacher (and active use of manipulative materials). Teachers must develop and follow-up questions which make it possible for the children to reflect over their own answers and determine the similarity of these answers to those of their friends.

From the beginning we conducted interviews both with individual children and with groups of children within a classroom or at the day-care centre. This can be done naturally, but one becomes conscious that there are many events which surround the children and the interviewer which influence the children's capacity to concentrate. Whether an interview can be conducted within the children's group or in an adjacent room depends on what we want to know about the children.

Sometimes we have met teachers who thought that it was a mistake to take the child alone into an adjacent room and interview him there. Certain teachers are sceptical about allowing a child to be the subject of a one to one interview and not together with other friends. The teachers' scepticism probably arises from the debate about not seeking out and judging individual children. The teacher has experience of the test situation which she translates into the interview situation. Our experience is that children think that it is fun and exciting to go out and be interviewed. We believe that a large part of what the teacher does with so little time and so many children does not allow her to devote much time to the individual

child. Children are usually in competition with many friends for the teacher's attention. Thus, the child gets interested when an adult devotes her total attention.

The following episode illustrates how children view being interviewed alone. It is free activity time at the leisure centre and one child goes to the adjacent room to be interviewed. When he returns to the group, 18 children stand up wanting to be interviewed also. They yell, "I want, I want." This reaction is more the rule than the exception.

Posing Questions

We had worked with children for many years before we began to conduct interviews. We believed therefore that it would not present a great problem. We soon observed that it was not as easy as we believed to go through an interview in dialogue form. We discovered the following. First, one must go through many interviews to develop competence. By conducting and creating interviews, one also learns how to develop and follow-up answers. What questions can be understood by children ?. How could a question be posed in an another way at another point in the interview?. We also learned to give the children the time they need to answer and to avoid, particularly in the group interview, answering in the children's place. This is otherwise a mistake interviewers often make in the beginning.

Give the child time

Children always have something to say, but we must give them time to think. Not letting the children complete their thinking is an easy mistake to make. But if we want to know what children think we must give them a chance to do this. A teacher told us about how she once give a quiet child an exceptionally long time to think. She was amazed at what happened. After a long pause, the girl began to talk and had a great deal to say.

Questioning techniques

Here we will give examples of different types of questions and point out that the form of the question is dependent on the purpose of the interview. How and what one should ask must always be related to the purpose of asking. When seeking understanding about how children comprehend questions of a more general nature, such as learning, mathematics, rules or reading, one must develop many questions of varying character and contents. If on the other hand one wants to know what children comprehend about general subjects, or how they understand break-time, one would develop fewer and more precise questions.

The character of the questioning technique suggests that we begin with the wide and overarching questions; i.e. with a broad approach which gives a context for more specific questions. This does not mean that one cannot begin with concrete situations. Let us say that we want to know if children in a certain group have initiated their own learning.

-We would begin by asking the child to tell us something about what she has learned. Here the child has many possibilities and is wholly free to suggest what she wants. If she is not spontaneous and says that she has not learned anything, we question more specifically and narrow down the questions. If the child's suggestions do not relate to knowledge in the wider world, we narrow the questions further.

-This can imply that we question: "If you want to know where an elephant lives, what would you do?". "Are there many ways that you could find out?" etc. Many examples of other specific questions are offered later in the chapter.

- The wider questions, those with many possibilities, are for the child who chooses to adjust and give many opposing ideas, while the narrower, more precise questions are selected and adjusted to the child. This is done to make it easier for the child to understand what information the interviewer wants.

Different Types of Questions

The starting point of the interview should be a situation or experience which the child is familiar with. It is always easier for the child to reflect upon concrete situations, experiences, etc. than to reflect upon theoretical principles. The closer one comes to the child's environment in the interview situation, the easier it is to arrive at a suitable starting point for the interview. To begin an interview with a conversation concerning something that one has experienced or something that one knows that the child has experienced in the classroom or day-care centre, creates trust between the interviewer and the child. If one has a conversation about the contents of a book, it is easier for the child to talk about the book if he has it with him in the interview. When talking about

colours and shapes etc., suitable articles should be available at the interview.

The younger the child is, the more important it is that the conversation includes reference to concrete material at hand. Paper and pencil is also useful, so that the child can draw and talk. Dolls, toy animals or puppets could also help the younger children to act out the conversation.

There are many different ways to ask questions so as to bring out the child's understanding and thoughts about specific contents. We will also influence the follow-up questions to the child's answers with questions which have the greatest meaning for an in-depth interview, which we will come back to.

Questions to which the child can answer either "yes" or "no" are not advisable. They do not give information about how the child thinks about the interview "object."

Tell me!

One type of question which children often comprehend easily is where one asks them to tell about something for example, *"Tell me about something you have learned.,"* or *"Tell me about when you began to count."* This technique does not mean that the questions allow the children to talk in very general terms. The interviewer narrows the questions in order to discover what the children know.

It is better to give a clear direction e.g."Tell me..." than to use "Can or will you tell me...", where the child can often say "no".

Teacher: *Can you let me hear you count?*
Camilla: *No.*
Teacher: *How far can you count up to usually?*
Camilla: *Not up to 100 usually... 1, 2, 3, 4, 5, (etc. to 29). I can count to 29.*

Describe how!

The interview must have the character of a conversation and not be an interrogation. The more interrogative the interview, the more unwilling the children become to reveal their thoughts. When we ask the child to describe something special that he/she has learned,

then we must accept what the child describes. This implies that if the child responds to an early question and says that he/she learned to ride a bike, then we must expand on that question i.e. "What did you do when you learned to ride a bike?" The child gains the capacity to describe how they comprehend what they have learned.

One can also let the child choose and describe *critical situations.* One asks the child to describe a situation which is connected to the problem one wants to illustrate in the interview. For example, if one wants to know how the child views fear, one could ask: "Describe an occasion when you were really afraid." If one wants to know how children view the school situation, one could ask: "Describe something that happened which was really happy (dull, tedious) in school." If one wants to gain insight into children's moral development one could say, " Tell me about a time when you did something really foolish." etc.

General and specific questions

In an interview one ought to use a combination of general and specific questions. By general questions we mean questions such as: *"Tell me what it's like to be in the child care centre? Tell me what it's like going to school?"* Through development of these overarching questions, the children have the possibility to direct and adjust the conversation. The child says things as they come into his/her head. A specific question which one could ask if one wanted to know something special about the child care centre or the school is: *"What do you do when the teacher says that there are too many in the woodwork room and you really want to be there?* What do you do in the school if the teacher presents a new maths problem and you do not understand it?" The younger the child, the more difficult it is to have an open-ended question, and only ask them to describe something, because they often need more specific questions in order to be able to answer.

Direct and indirect questions

Direct or indirect questions are another aspect to consider. We will use an example here. Take a situation in which children will not play together. As a teacher, one might then want to know how the children understand this situation of opposition. A direct question

could be: "Why do you never play with Thomas?" An indirect question in this context could be: "Why do you think that certain children do not play with other children?". Both types of questions can be used to get to the same type of answer, but one should be clear about whether the question is within the capacity of the child to explain. Questions requiring the child to explain something are more difficult than questions of a narrative or descriptive nature.

Use pictures to help

Using pictures at the start of an interview provides a further way to help the children reveal their comprehension or thoughts about something. The child can describe what is shown in the pictures. A development from this is that after the child has spoken about something, other questions can be formulated i.e. "What do you think happened then?". In a similar way, the interviewer can then ask about this situation or a situation which the child then can continue to develop.

Statements

Questions related to conduct have to be used with great sensitivity. Although sometimes it may be legitimate to use statements which begin with: "You like to... It is good to... Children should not... Parents should not... You are very happy when..." etc., these should be used sparingly and at the end of the interview, when this type of question is least likely to disturb the security of the child. This can contribute towards breaking the social contract. However, these questions can be useful, particularly to probe what the child had said earlier and make contrasts. For instance, if we want to know about the child's understanding of teacher authority and in the interview we come to know that the child thinks that the children should determine the rules, and not the teacher, then we can say the following: "You think it is right that the teacher tells you what to do." The child's answer will give us insight into how much the child holds fast to what was said earlier.

Using this type of question format demands that the interviewer is sensitive to the child's reaction. Should the child become unhappy and uncertain about his/her previous answer, the interviewer must help the child examine this. If the child, on the other hand, does not

change his/her statement, throughout the interview one must develop further follow-up questions to become clear about which understanding is the child's own.

The same questions - different contexts or different contents

A question posed in one context around one specific content area may be incomprehensible to a child, but, in other circumstances, or with another context, it may be easy to understand. By asking children the same questions, only posed differently, more modulated pictures of the children's representations can be obtained, as the child is given several chances to answer. The children's experiences to a large extent direct their thinking about the essential contents of the question. By extending their opportunities to answer the questions, we greatly enhance their possibility of informing us on the issues we are contrite to know about.

To illustrate, the problem of calculating of "10 minus 6" is one which many children of pre-school age cannot directly solve. On the other hand, if the same children are given the question: "You have 10 crowns and want to buy an ice-cream which costs 6 crowns, how many crowns would you have left?" it is clear that many of them could complete the task. This also shows that when a question is developed which relates to the child's life experiences, the possibilities they have for solving it are increased. Another way to provide a sensitive description of the child's understanding is to ask a question with a different content.

One example of this is when the teacher wants to know if children can comprehend certain changes in their own thinking. Questions can be developed in two different ways with different contents: "Do you believe that you think in another way now than you did when you were little? Can you give me an example?". Another way would be to ask a child if they could remember what they thought when they learned to ride a bike and how that is different from what they think about riding a bike now. Many children can skilfully tell their own thoughts when the question is tied to their own experience[10] .

Mixing difficult and easy questions

In an interview one should also think of questions of varying levels of difficulty so that easy and difficult questions are intermingled. This is important, partly so that the person interviewing can develop an understanding about which questions have some meaning when asked, and partly so that the child shall not be asked difficult questions at the end and not feel a failure.

Questions develop through experience

Sometimes is it hard to determine how children comprehend or why one should test questions with one or more children as one begins the real interview situation. This implies that one might find it difficult to formulate questions when one has to do many interviews. This is a way of behaviour which one might have to repeat several times before one feels that one has reached the child and captured the child's world of thought. The development of questions enables teachers to become widely competent in giving children a chance to reveal their thoughts.

Following up a question

Irrespective of which questions we choose to ask, we must follow them up using the child's answer as the starting point. This involves a difficult balance between letting the children talk freely and using more controlled questions in the interview. Without control there is a risk of not getting the information one wants to know, not knowing what to do after the interview, and or simply not learning anything.

Previously, "the best" interviews were considered to be those where various questions (and possibly follow-up questions) were prepared in the exact same way for every child. This implies that all of the children are treated in exactly the same way. But the type of interview we encourage builds up on the fact that every child is handled as an unique individual. This implies that one can ask a question in different ways, but above all, it implies that one always follows up the children's answers in various ways.

Following up answers in an interview so that the child can reveal his/her thoughts is what we earlier called deep (intensive) interviewing. This requires that interviewers are sensitive to the children's answers and formulate follow-up questions from what the child says. Thus, each interview has, in some way, to be a unique event.

To illustrate: Johan comes with a piece of wood which has a number three written on it. He states that he has written it himself and takes the teacher by the hand to follow him to the woodwork room. He wants her to write a number three on another piece of wood. The teacher has long since determined that Johan could not have written the number himself and becomes interested to know what he sees its function to be. She decides to proceed as follows:

Teacher: *What are you making?*
Johan: *You can see.*
Teacher: *No, not exactly. . .tell me.*
Johan: *Its a racing car of course.*
Teacher: *Oh. . . .I see*
Johan: *So there needs to be a number at the front and back for it to be a racing car.*
Teacher: *Why does a racing car need a number?*
Johan: *You know why.*
Teacher: *No, I don't know. Why are there numbers?*
Johan: *I can't say.*

(The teacher thinks how she can continue the conversation and help Johan to talk about what he sees the functions of the numbers to be. She pauses for a moment and then says. . .)

Teacher: *Tell me how you will make the racing car? Which piece of wood will you use?*
Johan: *First the length, then the width, and there must be wheels.*
Teacher: *Will you paint it?*
Johan: *Yes, it will be red.*
Teacher: *Where will you put the pieces of wood with the numbers on?*

Johan:	*One there (front) and one there (back)*
Teacher:	*But why, really, does a racing car have numbers?*
Johan:	*You know why . .*
Teacher:	*No, I don't usually go to car races.*
Johan:	*But you know. . .*
Teacher:	*Should they come in the order they have numbers... or what do the numbers mean?*
Johan:	*They tell you who goes the fastest of course.*
Teacher:	*Oh. . I didn't know that.*

Here we can begin to see how Johan saw the number's function which was so important for him to write on a wooden block which he would use for the racing car. The interviewer knows what she wants to know the entire time. Johan's answer in the beginning shows evidently that he thinks the teacher is joking when she says she wants to know why the numbers are there. Naturally it could also be that Johan had never previously wondered why racing cars have numbers and therefore could not answer. When he had time to think, he could tell her which function he believed the numbers had. We see also that when Johan expressed that he did not want to say how they happened to go together, the interviewer changed the approach and began to talk about things which must be done to make the racing car, in order to re-establish the original questions of the interview. The possibility also exists that Johan answered the teacher's last question without really listening to what was meant by it.

This situation was enacted in a child care centre. Another teacher felt uncomfortable when she heard the conversation. Afterwards she said, "Oh, how stubborn you were with Johan. I would have stopped much earlier." Stubbornness in this case resulted in the child revealing his thoughts, but the interviewer must maintain a balance between being "stubborn" and having a sensitivity for when it is not suitable to go on to wider questions.

Clear purpose combined with flexibility

When doing this type of interview one *cannot have a detailed plan of all the questions,* but it is important for the interviewer to be clear about the type of information sought and the territory which one wants to know something about. Fewer questions can be formulated in advance, more force is used when following up what the children say.

Through the process of leaving it up to the children to choose the direction of the interview, it sometimes happens that the children talk about things that do not have direct relevance to the interview. The children may want to sing a song, which one should let them do. For in interviews it is easier to bring the child's thinking back to the interview situation, if one also listens to the children for a short time before continuing the interview once more. Furthermore, although from the interviewers point of view what occurs with the children may seem to be difficult and not concerned with the topic, they can later see that it has meaning in order to help understand the child better, even though one has to be clear about the amount of information which cannot be used in the analysis.

Give the children a chance to develop their thinking

We have earlier stated that it is important to follow-up and give the children an opportunity to develop their thinking. Possibilities to do this partly come from the children's answers. Let us look at two children who are asked: "Do you know what a rule is?"

Britta: *Yes, we must wash our hands before we eat.*
Teacher: *Why should we do this?*
Britta: *The teacher says that we should.*
Niklas: *Yes, for example, one should not lie.*
Teacher: *Why is that?*
Niklas: *Imagine if Mum said that she was going to the shop but she went on a trip instead.*
Teacher: *Did she do that?*
Niklas: *No, Mum doesn't lie.*
Teacher: *Do you know anyone that lies?*

Niklas: *My friend Peter, he said we were going swimming but he didn't come.*

In Britta's answer, " The teacher says that we should", we do not get many possibilities to expand the follow-up. In contrast, the development of the follow-up with Niklas consists of a long discussion.

Sometimes one is not satisfied with the follow-up of the questions. Whether the question itself was a mistake, or whether one believes that the children have told all that they know, the result is that one does not follow-up with more probing questions. This often happens when the interviewer has not listened carefully to the earlier comments of children. For an inexperienced interviewer, it is easy to be satisfied with the first answer the child gives, for it is hard to know how far to press the child.

The next example is of two children to whom we ask the same initial question, but the follow-up answer leads to different results.

Teacher: *Why do you think it is good to be able to count?*

Ola: *It is good to be able to count money.*

Teacher: *Can you see what we have written here on the blackboard?*

Ola: *Nine.*

Teacher: *Why do you think it is good to be able to count?*

Lisa: *It is good to be able to count money.*

Teacher: *What do you mean?*

Lisa: *I count my pocket money.*

Teacher: *Why do you do that?*

Lisa: *Well, I am saving five crowns every week to buy a doll for Christmas.*

Through Ola's answer we do not know what he really means by counting money. We must keep asking questions until we are sure that the child has no more to say.

Changing direction

Just as important as following up questions is that the child understands that we can transfer the contents of discussions to another part of the interview. In one situation where the children were not attentive we repeated a question as follows:

The children solve a task in which they are to receive five raisins. The next question is: "If you have two and get two more, how many would you have?". "Five" answer the children after some difficulty due to the image left behind of the five raisins from the previous problem. Later in the interview the children are asked the same questions and answer, "Four." We interpret this as being to difficult for the children as the first situation referred back to the situation with raisins. We would have done the children an injustice if we had not changed the order and asked the question again in a new problem.

Be an active conversation partner

How can we help the children to develop and express their thoughts? It is necessary to show interest and encourage the child as we indicated earlier, but we must not dominate them. As an interviewer one must be active in the conversation and ask questions which encourage the children to understand and develop their comprehension about something. The type of questions we think of here include: "What do you mean? Tell me more. I don't understand. Tell me again. How do you know that? How can that happen? Why? How? When? Where?" etc. Sometimes it helps to repeat what the child just said:

Teacher:	*If you have three pearls and you get three more, how many do you have?*
Bodil:	*Four*
Teacher:	*Oh yeah, four.*
Bodil:	*Yeah, if you have three and put them down one, two, three, it becomes four.*

Bodil continued her development when she went back to her answer, through the repetition of her answer by the interviewer.

It is very difficult to free oneself from the entrapments of a teacher's role which focuses a great deal on the correctness of the children's answers. But it is necessary. Our view of learning has brought us to see that the way the answer is given is more important than whether the answer is correct or not. The consequence is that our interview procedures have the character of a dialogue, which implies reciprocity and mutual turn taking in communicating, i. e. both the interviewer and the child become significantly involved in the development of the conversation in the interview.

In conclusion

Throughout the interview one must be sensitive to the *suggestibility* which easily develops in the interview situation. This develops naturally when the child talks with adults. Often the child strains to listen to what the adult has said. Children are used to accommodating their words to those of the adult. This demands great sensitivity when one interviews children.

Interpreting Children's Interviews

If an interview is to lead to new knowledge so that teachers may come to understand children better, it is necessary to work thoroughly through the children's answers. How systematically one does this depends entirely on the purpose of the analysis. To get information from the interview, the interview situation itself and the data which comes from it must be viewed as one complete process. This must be done with sensitivity and skill, both with respect to the purpose of the ongoing dialogue and in interpreting the information which comes from it. It is important that we are aware of what we really want to get out of the interview. Becoming a skilled interviewer as well as making a qualitatively good analysis needs a lot of practice by the teacher. The analysis begins when we read (if the interview is transcribed) or listen to (if the interview is only recorded) the children's answers one-by-one. In the analysis we write down the different answers the children have given and create descriptive categories for them. These categories come from the children's expressions and are solely created from their answers.

The different answers given by the children

We shall now illustrate the different facets of the analysis procedure. We have chosen to describe how children comprehend what they learn through watching television. The expressions quoted come from different "places" in the interview. Let us look at answers from ten children who were asked the question: "Tell me something that you have learned through watching T.V." The ten answers are taken from longer interviews. These answers are the most advanced which have come from any single interview and were facilitated by follow-up questions.

Stina: *I have learned to turn the T.V. on and off.*

Kalle: *I have learned to tune in to the right channel now.*

Agnes:	*Once I learned to cut out different figures through seeing them on T.V.*
Patrik:	*I have learned to write the alphabet.*
Eva:	*I usually read the text on the films, so I have learned to read.*
Magnus:	*I have learned a lot of rhymes and poems.*
Gunilla:	*I have seen factories in South America which release many dangerous chemicals so that children become sick and get rashes all over their bodies.*
Kerstin:	*I have learned that you can get allergies from certain earrings.*
Oscar:	*If you watch too much T.V .you can go blind.t's really dangerous.*
Siv:	*If you watch T.V. too late at night, you don't have the strength to listen to the teacher in school.*

The children's answers are quite different. Some talk about the T.V., while others talk about something they learned through watching T.V. It is necessary to have access to the whole interview when making an analysis, because much of what we can use is related to an entirely different question. The children's answers can become easier to understand when seen in the context of the whole interview, and through the adjustments they make to their answers, one can see how children comprehend what they have learned. All children answer in such a way that it is possible to drive information that teachers can use when they analyze and interpret the children's understanding of certain contents, principles, ideas, or situations.

Children's thinking patterns

From the multitude of answers received from an interview, one can find different forms of comprehension from which these answers come. In the different answers from the children above, we find

four different categories of answers based on different levels of thinking.

Category 1: Concrete actions with the T.V.

The first two children (Stina and Kalle), answer the question by showing what they had learned to do *with* the T.V. rather than what they had learned *from* the T.V. In the interviews in general these two children showed they understood learning as concrete actions and therefore indicated their capacity to turn the T.V. on and off as the most important thing they learned. What took place on the screen was only picture and sound which the children did not think they learned anything from.

Category 2: Education.

The two last answers (Oskar and Siv) are connected to the *effects* of watching T.V., which these children had heard of from their parents or teachers. From the children's answers one can imagine what the adults had told them when they wanted them to stop watching T.V. For these children, learning from the T.V. had become connected with what they had heard from adults.

The other six answers express that the children had learned something themselves when they had watched T.V. Two different categories are evident from their answers.

Category 3: Concrete situations from the T.V.

The answers given by Agnes, Patrick and Eva are expressions deriving from the relation between observation and act. Through imitating what they saw on T.V., the children say they had learned to do something i.e. to cut out shapes, to write letters, or to read. The children express that learning to perform something concrete was the most significant aspect of their learning from the T.V.

Category 4: Information from the T.V.

Finally we have Magnus, Gunilla and Kerstin who indicate that they have gained new knowledge through watching T.V. This means that they have learned to *know* something through watching T.V. The T.V. provides information, and the information

which they received led to their comprehension of having learned something.

Comments

These four levels or categories outline the children's comprehension about what they had learned through watching T.V. When teachers analyze the first two categories, many say, "But the children have misunderstood the question". We don't see it this way. It is not that certain children have understood and others have misunderstood. Every child understands, but from within their own development and in relation to their own experience. What is essential is to understand *what* they have comprehended.

When the last two categories are evaluated, we see a clear difference in the children's views about their world compared with the two earlier. Here children deal with the contents aspect of T.V. viewing. The content aspect takes on different forms of expression. What children in category 3 comprehend as significant is doing something concrete through watching T.V. In category 4 the children express what information they had comprehended, i.e. that knowledge creation is important.

After the differences have been identified in what children have comprehended or thought about a certain subject, and categories for describing these differences have been constructed, the next step is to place children's answers into the descriptive categories one has made, until all the answers are in a category. Through seeing what an individual child says in relation to all the interviews, the pieces of the puzzle fall into place little by little and thus a map is developed of the *variations in thinking* which one finds in a group of children. These findings can then be related to the contents of the work one does or in which one is interested. However, placing the representation of thinking in various categories is not an expression of the quality or capacity of the children, but an expression of how the children behave in a certain situation or with certain contents. Through the interviews and their analysis, one gains knowledge about the variation in thinking within the group, and how an individual child has comprehended or understood a certain content.

The standards used in analysis work depend on the goal of the analysis. We believe of course that teachers must go through the interviews and the systematic analysis process to obtain an understanding of the child's world of thought. When teachers do this, they are forced to reflect on the children's expressions and try to understand how and what the children have comprehended about their own learning experience. They can then begin to learn to understand their own daily practice in relation to this.

Reliability

Sometimes completing the interview process seems less interesting to the teacher than considering what an individual child has understood and what that shows about the child's world of thought. But what one is able to know depends largely on the quality and the quantity of the interviews. The following questions are important: Has one succeeded in following up on the children's answers? Has one succeeded in reaching behind the cliches of adults and reaching what Piaget has called the children's *genuine* answers; expressions of their situation and thoughts? This only happens if the children have been able to reflect on what one asks them and arrive at an answer after they have pondered over the question.

Let us look at an example of how two children have different understandings. Selma and Pelle have both been asked the question: "If you wanted to know how heavy an elephant is, how would you find out?"

Selma: *You could go the Zoo and ask the keeper to put the elephant on a scale.*

Pelle: *I would ask my mum, and if she didn't know, I would go to the library and get a book.*

Later on in the interview further questions were asked which sought to find out how children comprehend knowledge. These questions ran as follows: "If you did not know how far it was from here to the moon, how would you find out?"

Selma: *I would travel into outer space and ask an astronaut.*

Pelle: *I would ask my dad and see if he knew.*

Teacher: *And if he didn't know?*

Pelle: *I would look it up in our reference book.*

What do these children's answers reveal about how children think? How do the children's representations prepare for understanding something? For Selma, the existence of knowledge is not something free-standing but is tied to the personal situation, i. e. she must act and go there in person and find the answer to the question. On the other hand, Pelle's conception of knowledge is no longer personal or tied to somebody participating in an activity. Knowledge exists in itself he implies when saying one can find the answer from someone or from reading a book. The comprehension of the children in the first situation is corroborated in the second situation. This can partly be seen as proof of the reliability of the children's answers, the part that mirrors the child's genuine answer.

To receive genuine answers, one need not always ask several similar questions but one can develop follow-up questions instead. In the following example a teacher was determined to find out how Petra understood break-time at the child care centre.

Teacher: *Petra, why do we always have break-time after eating here in the centre?*

Petra: *So the teachers can have a break.*

Teacher: *Oh yeah, can you think of another reason?*

Petra: *No.*

Teacher: *Don't you think it is good for the children?*

Petra: *No, not for children, its so that the teachers can have a rest and eat.*

Petra's answer seems genuine as she did not change her opinion that break-time is for the teachers.

To arrive at the children's genuine answers, one must learn to sort out other types of answers which one can receive in an interview. At times, children are bored and want to finish the interview. *They*

can then give an answer which is affected by the atmosphere and which does not reflect their comprehension. For example, if a child is asked: *"What food do you like best?"* and the child says: *"Fish cakes"*, it could be because he/she has just eaten them and said the first thing that came to mind. This type of answer is often easy to recognize through body language which shows that they are uninterested or tired. Sometimes they have a gleam in their eyes when they answer haphazardly.

Another type of answer which one must sort out is the children's *fabrications*, i. e. when they fantasize and simply say anything.

Teacher: *Peder, do you have animals at home?*

Peder: *Yes, I have an elephant which lives in a hut in the garden. We have planted three palm trees around the hut.. .*

Finally, interviewers can sometimes pose questions which guide the child and *suggest answers to the child.* The child answers wholly for the interviewers satisfaction and does not reveal it's own thoughts:

(In the middle of the interview)

Teacher: *What we like about Sweden is that we can go to school to learn to read and write. How do you think it is in other countries?*

Maria: *I don't believe that everyone can go to school.*

Teacher: *By the way, what do you think is the most important thing to learn in school?*

Maria: *To learn to read and write.*

Maria has sensed that the teacher thinks that the most important thing in school is to learn to read and write. This type of answer is usual in school settings where the child is used to the teacher waiting for the one right answer.

These types of answers have shown that one must be very observant in an interview or one will be placed in a situation where one has an interview full of fabrications and suggestions about

ending the situation. Sometimes, however, these fantasies can provide something that can be interesting. If one plays around with the children's fantasy world, it is sometimes astonishing how this "make-believe" can be so spontaneous.

Another check on reliability is to seek out how the child comprehends the situation, task, or question which is easy to do through asking the child: "*What should you do?*" or "*What did I ask you about ?*"[24]. These questions guarantee some reliability when one hears anticipated responses throughout the interview process and can also be of great value in the interview analysis.

Widening the situation so that one can depend on the answers one receives is important when trying to find thought patterns within the children's answers. Children often give similar responses about their comprehension and their answers can be placed in the same category[1] . How one divides up the children's thought patterns from the answers received is a question of the adult's interpretation and the children's expressions. This implies that in the interpretation of the interview on watching T.V. (earlier), one person may describe the categories in another way. On the other hand, if one gives instructions and descriptions of what the different categories stand for, which we did, the other person could well place the interview responses in categories in the same way. Whether or not they do so is a check on reliability.

When interpreting interviews as one goes through them, it is important to utilize a frame of reference. How much one knows about the child and the conversation with him or her makes it easier to understand what the child says. When interviewing a child with a book, an answer to the question: "What shape is this?" ... "It is a triangle for it has one, two, three, four, five sides, " is wholly incomprehensible unless one had earlier seen the instruction for the children and learned that the way shapes were defined was through counting how many sides and how many corners the shape had. Rattling off what she had earlier learned became central for the child, although that she could not relate it to a specific shape. They had counted sides and corners every time they had seen a shape and the child had seen counting as the essential thing.

The teacher who has established a frame of reference with the children, and constantly meets them and is part of their reality, has a clear advantage in analyzing interview data. There is a demand for sensitivity and openness, but the teacher must also free herself from her old teacher role, in which she merely sought to know if the child's answer was right or wrong.

Is the teacher's interpretation subjective? Naturally it is, coming from within, as she interprets things from her frame of reference and knowledge. The teacher's integration with the children is a subjective reality, which has some positive elements. If the teacher's subjectivity is based upon her work with children and with her understanding of them it is positive.

Using New Knowledge

In accordance with the 1980 Schools Act, free choice primary school work ought to be connected to what children see from the pre-school as valid, and there should also be flowing boundaries between lectures (teacher direction) and free activities. The act made communication between teachers within the pre- and primary schools imperative and teachers now need to develop mutual goals related to the children's learning. Because of this, evaluation in both institutions needs coordination. Child interviews provide a natural and simple means of assistance here. These are conducted in the children's natural environment and teachers come to know children's comprehension and thinking which later becomes helpful in planning.

Another area is parental contact, which is of importance to both pre-school and school. From the school's perspective, two parent conferences per school year are stipulated. Within the pre-school it is not that precise, and it is rather the number of hours a teacher works that is the concern at the moment. At present teachers look forward to informing the parents of pre-school children about how the activities of the pre-school prepare children for school. It is important for parents to know about the contents and methods used in pre-school and school. But it is just as important for teachers hear the parents views. As parents we all know when we tried to help our children with their homework they sometimes said: "No, the teacher does not say we should do it like that!"

Evaluation-planning

Earlier we gave examples of how children's comprehension of content varies. Before we continue, we will now stop and think about some other examples.

The theme "Other Countries" was studied in a pre-school for a few weeks and was then evaluated. At the end of the second week, the

children were describing to each other which country they would like to travel to:

Ida: *I want to travel to Yugoslavia and visit grandma again.*

Lars: *To the west coast.*

The teacher corrected Lars and said that the west coast was not a country and that he should think of something else. Lars couldn't, and irritation arose in the group. Another child said that Lars could say Africa, but Lars really did not understand and just sat quietly. This is an example of evaluation which happens in our work daily, and which can be a help in planning. Important information has been gleaned from what has happened which can help us support Lars to widen his thinking and knowledge. He does not have Ida's concrete experience as a point to start from. We must broaden instruction so that Lars gains comprehension of what a country is if we feel this is important for pre-school children to know.

In another institution working with themes, the children are given a concrete experience as a way of learning about numbers and their relationship to growing peas. The children measured and recorded the growth daily and made comparisons with earlier measurements, and after the unit was finished we interviewed the children. But it appeared that they had a different understanding of what they had talked about and done. Here is part of an example of how the children answered the following question: "What have you learned by measuring the peas and recording the measurements since last time we talked?"

Emma: *We have talked about peas.*

Marie: *Different seasons.*

Richard: *We talked about which day it is.*

Teacher: *Which day is it then?*

Richard: *March.*

Annelie: *We started to read fairy tales.*

Teacher: *Did we do something more than read fairy tales?*

Annelie: *Yes, we talked about what day, what month and what season it is.*

Karin: *Yes, we shouldn't be noisy, and about the seasons.*

Lena: *About the strips we tore from a paper.*

Teacher: *Why did you do it?*

Lena: *So that we only get one piece and then we could see what month, what date, and what season it is.*

Peter: *We counted children and then we measured peas.*

This variety of answers gives the teacher an idea about what has become important to the children. They had seized upon the different things. The focus of many of the children's answers came back to features of the calendar, their behaviour, and fairy tales. The children had not coupled their activities with learning to measure and count. That was not a central idea for the children. A number of questions arise here: How does one develop number concepts so that they are clear for children? What have they understood? How can teachers plan their work more widely so that their goals are understood? Which methods can one use so that the concepts will be understood by the children?

Children think differently because of the various experiences and life situations they have had. Likewise children and adults think differently. Another example of how a child thinks and associates is the following episode which involves the theme "Handicap". At the end of the second week working with this theme, the children answered a question about a handicapped child who was visiting. The conversation led to a question which Lotta was wondering about:

Lotta: *Why are fly agarics so poisonous when they are so red and pretty?*

Teacher: *(annoyed) Lotta, we are talking about handicaps.*

Lotta: *Isn't a fly agaric handicapped then?*

There is great difficulty in this instance for the teacher to be clear about what the child has understood. But because of an earlier interview with Lotta where she told us that she had learned from her mother that when one ate one became sick, we were able to fathom out her reasons for posing the question. What is the difference between becoming sick and being handicapped for a pre-school child? It is easy for the teacher to dismiss Lotta's question, since from the teacher's perspective it appears to be irrelevant. It is easy to believe that Lotta had not understood or was not listening. Teachers want to believe that children understand what they teach them.

When working with evaluation and planning questions, the teacher must consider which contents the pre-school and school should have. Today one speaks about the different methods one can use in teaching which are discussed first. We believe this is wrong. The first things to discuss ought to be the contents. The central questions to consider are:

* Which contents, i. e. which meaning, principles, or ideas should one work with in the pre-school and primary school?
* What is the children's understanding of these contents?
* How do children learn?
* How should teachers arrange the children's experiences?

These questions take on extra importance when we think about a new pupil who came to the leisure centre and described what he had done at school:

Bertil: *Today I have learned "b" (makes sound of "b").*

Teacher: *But you can already read.*

Bertil: *No, I am not using b, but "b" (makes sound again).*

Connection between the pre-school and primary school

Aside from organizational issues, two other questions are important to bear in mind when developing connections between pre- and primary school with regard to developing content which

ensures a learning continuity for children. First, what is important work for pre-school children which is also important for the children in primary school? Secondly, is there a time we can see interviews as an aid to understand children's comprehension and thoughts surrounding these contents and how they should be tackled?

To answer these questions we first of all need to understand other questions. If we take a specific area like mathematics concepts, we need to know: What are mathematics concepts for pre-school children? How should one work with them? How do children think about this? Knowledge for teaching about math in the pre-school and primary school can also be determined from the variations in comprehension related to the following question we have posed to young pupils: "Why is it good to be able to count?

Edvin:	*Because . .to see how old as person is.*
Olle:	*You should count when you prepare food.*
Teacher:	*What do you mean?*
Olle:	*When you buy food.*
Teacher:	*What do you need to count to do that?*
Olle:	*To count food.*
Helga:	*Because it is hard to go to school.*
Teacher:	*What do you do in school?*
Helga:	*Learn to count.*
Olga:	*Learn to read.*
Teacher:	*What should one learn to read?*
Olga:	*You have to go to school. The homework is hard.*

Some of the younger children have no comprehension about things like why we should learn to read or count. On the other hand, school children fall into two groups when they discuss why counting is important; one group says that counting has a practical use and another group says it is a part of school work. These understandings give ideas to teachers in pre-school. We have described earlier how the children's understanding of the goals for learning has meaning for what they in fact will learn. It is not a

good preparation for school if pre-school children form the understanding that it is difficult in school or that one has many difficult maths homework. These things can create anxiety for beginning school.

Children come to school with some idea of what school is for. Likewise, they have an understanding of what it means to learn to read, to write, to count, etc. But what are their opinions like ? Many children can already read, write or count when they begin school, so why should they go ? How do they think when they solve a simple mathematics task? Is the teacher's method to reproach the child for something he/she has misunderstood? Do we really know how children think?

Some pre-school children were asked the following question: "You have two crowns but want to buy an ice-cream which costs five crowns, how many more crowns do you need? "

Petter:	*(Raises his hand, puts down two fingers and sees that there are three left) 3 crowns.*
Nina:	*3 crowns, for 2 and 2 are 4 and 1 crown more.*
Nils:	*3, 4, 5, it becomes 3. (Starts counting at 3)*
Lillemor:	*(Counts 1-5 on fingers, then puts 1-2 fingers down and then counts the fingers which are left). I need 3 crowns.*
Per:	*Three becomes 1, 4 becomes 2, 5 becomes 3. It's 3.*

We see that all five pre-school children use completely different ways to come to the same answer. Some children are very direct and use their fingers to help them count higher. The way that Per and Lillemor attack the problem is detailed and time consuming. On the other hand, other children tackle the problem quickly and more rationally. Some questions which Unenge[21] raises are relevant here:

-When must we learn to think as children?

-When must we teach children to think as we do?

When selecting education content matter, teachers must first and foremost attend to how their pupils learn and to understanding things from the children's perspective. This is of primary importance, and not how long one should work with particular subjects. The 1980 law states that the teachers and students should work together to decide how long they will work with a specific task. Therefore teachers should not need to feel the pressure of time, but can take the time they need for every subject. Learning a concept properly takes time and so one must take time! This is as valid for the pre-school child as it is for the primary school child.

Parental involvement

Research indicates that parental involvement in their children's school activity influences the children's development in a positive way[25]. Developing effective parental involvement in schooling has become a major concern in many countries.

In a project in London[26] the importance of the parent's engagement in their children's school activities has been profoundly demonstrated. Parents were asked to take time to listen to their children for not less than ten minutes every day, when the children read a part of their reading book. The conclusion arrived at was that these children advanced in their learning of English and developed their reading skills more than those children whose parents did not participate in the project. An interesting aspect of these findings was that the parents were immigrants and could not speak English and therefore did not always understand what their children read. Nevertheless, when the parents listened and were interested there were still positive results.

There are many ways of establishing meaningful contact with parents. Investigations have shown that informal contact works best in general. The bigger and more formal the parent conferences are, the less the parents participate in them. On the other hand, all parents respond to a simple conversation[27]. All parents can become involved with their children's schooling. Our suggestion is that parental contact has to be developed around how the children comprehend things in school and that this should become the starting point for a conversation between parents and teachers. We

teachers need parents to help us appreciate what their children's descriptions of pre-school/school mean to them and what the children describe to us of their life outside of school. If children do not describe the two worlds in and out of school, we need to know why this is so.

How children experience their situation in the pre-school, the leisure centre, the school, and at home reveals how significant these situations are. It does not help if the teacher says that Tina understands things well in school if Tina on occasion cries and does not want to go. What does the teacher really know about the children's sense of plodding through homework or the children's dread of going to school when they have forgotten to do their homework? Would the teacher perhaps be less irritated with Bosse when he had forgotten to do his reading for the third time, if she knew that Bosse had tossed and turned half the night worrying about not understanding the book?

Do the parents think that these incidents are too "trivial" to discuss with the teacher? Do teachers invite parents to offer possibilities to discuss similar "trivialities"? Does one believe as a teacher that one must describe for parents how capable their children are in school because one believes that is what the parents want to hear? Or do we feel the parents only want to hear about the child's intellectual capacity in the traditional formal way?

How rigid are we in our roles as parents and teachers? As a parent, should one appreciate when the teacher talks about how a child gets 20 out of 25 right on a particular test, when what the parents really want to hear is how the teachers and friends feel about their child? Our experience is that the parents soon forget the score on a test, but they always remember episodes where the teacher describes what the children have said or done. Contact between parents and teachers must involve an increased understanding of the child from both perspectives. After all, one should co-operate for the sake of the child and not so that the adults can get to know one another!

How to use the time available

"What you have shown us is very positive, but how will we have time to do it?" is a response which many teachers have given us after they have read the preceding chapters, for the teacher really understands that the process includes more than just conducting interviews. We shall discuss how and why teachers have to be given time to use these processes in the remainder of this book.

Teacher's consciousness

We have written a whole section about children's thinking and why they need to reflect on their experiences in order to develop. This "inner work" must become central to the way we design our programs. We teachers also need to reflect over what we previously had taken for granted and to come to terms with what is deeply meaningful for children. *What is meaningful for children and what is not?*

Recently an episode happened in a pre-school when a girl was working with her fifth "pre-school book". At an interview it appeared that she had no idea about the whole task and why she should do it. She did it for the teacher's approval. One can suggest a more meaningful form of school preparation, one which does not encourage the chilren's active thinking but one which builds on passive repetition of the teacher's instruction.

How one as a teacher uses the time available is significant here. The teacher that thinks that adjusting oneself to the children's learning is important will help children to develop their thinking around a central concept, principle, or idea. To help the children further their thinking, the teacher will try to develop her consciousness concerning which situations she talks about with children, how she phrases questions, follows up with additional questions and how much time the children get to think completely. Interviews have some meaning for developing an understanding about how children think. Here is another example:

The teacher and children travelled to the market square to buy green vegetables. The children were to choose which of the green vegetables to take home with them. Stefan could not choose which vegetable he wanted and was going home without any. Presumably Stefan could have made a choice if the teacher had taken time to discuss with him which vegetable he liked. This is an example where the teacher on a field trip did not take the time to help the children reflect and make a decision.

On another occasion the teacher and children took a trip to the beach, where the children made a collection of things they found there. The teacher went around and looked at what the children had collected. She paused and asked each child: "How many things have you got?" When the child had counted his articles and answered the teacher, she was already on her way to another child. It is important to ask the children questions, but it is just as important to take time to listen to the children's answers and follow-up with new questions to help them broaden their thinking.

This consciousness is something that we as teachers must have both for ourselves and for the children. How often do we not break up a group of children which we think is "too big", without first stopping to listen to them? Could it be that we don't give ourselves time to listen to them and what they have to say?

Planning-Organization

It is not always possible, even with the best tactics, to only work at interviewing individual children. It is therefore important to complete an overview of the working moments which arise in the day's activities. Is the teacher always alone or are there times during the day when there are many people? Are the children always working freely in the pre-school and with "lessons" in the primary school? Is there time when children are occupied with different play and work tasks? When is it valid to have different times to converse with a little group or a single child?

In the pre-school and the leisure centre as well as the primary school, children are conversing in groups for much of the time. There are periods of group work, conversation, creative activities,

outdoor play, breaks and pre-school free play, in which one can actively go in as the teacher and learn to know how children think.

Earlier we gave two examples from conversations in the pre-school where we had had discussions with children about the themes "Handicap" and "Other Countries". Both of these examples show us that it is not always necessary to arrange a special situation to probe children's thinking, for on these occasions conversation periods gave us the opportunity to get information. Both during the lessons in school or during the day's activities in the pre-school, there are many opportunities which arise to do this naturally. If one sees that it is of great importance and meaning to become aware of the children's thoughts, one finds it easier to be observant of the possibilities to invite children to spontaneously give information.

If there does not seem to be the time or the possibility to listen to the children's reflections before other children become restless, it may be that there is too large a group. Maybe one must organize this so that some children have individual tasks to do while the teacher discusses with others.

When children are active and creative, building, experimenting, role playing, reading, writing and counting, etc, excellent occasions arise for teachers to talk with or interview children. Then there is a concrete situation which one can use to talk about. We can organize work during break-time in school or with children in outdoor play at the pre-school, go round and see why individual children are noisy, and take time to talk with children about what they have done. When we go for a walk in the woods or go out on a field trip and we can follow this up by talking about what the children have found fascinating instead of being satisfied that we have given children information and then hope that they have heard and understood.

Profit for pedagogy

When teachers have reviewed their planning and organization, it becomes important to set priorities. To have the understanding of

the children as a priority ought to be self-evident, but to actually do this is hard work for the individual teacher.

To interview or to gain information through structured conversation with a single child or a group of children must be seen as a natural part of the work and not something intruding on it. The only essential principle is that the teacher must know what it is that she wants to know about. To be effective, one must take every opportunity to gather information to aid the children in their development. Just now they are not. For instance, as leisure educators often point out, teachers misunderstand outdoor play in the yard. They don't get involved in it and don't ask questions about it and hence don't have a clue about what happens there. From the adult's perspective, children's play is seen as meaningless hopping and climbing. If the teacher knew about children's understanding, they could on occasion give the children new play materials and new information which could result in more developmental play.

There are some obstacles which inhibit the teacher's willingness and opportunity to engage in outdoor activities with children. Some teaching groups have 16 to 21 children, and teachers believe that it is too difficult to go out. They often have many good arguments about why the children should go out during the day, and the teacher never told the children about these arguments and the rule "we must go out for some fresh air". Teachers rarely follow-up what happens at play-time, unless there's been a fight or accident, and do not use this as developmental time.

The interview is a way to learn about children and can also be seen as a goal in an educational sense. This implies that if one talks with children about things which they never before have thought about, it is imperative that the child begins to think about what one has told them. For example, a child who at the first interview situation had difficulty coming up with something he had learned, came bouncing back a few weeks later, stating that he had learned the whole alphabet over the weekend. Through the questions teachers ask during the interview, children begin to think about issues i.e. their thinking is influenced.

At another interview a girl answered that she had never needed to think about how much an ice-cream cost and should not count

money, for that is what her mother did. After a few weeks, when we visited the school again, she said: "Now I have thought, for I began to pay with mummy's change. I have learned to count now." Even in this situation the interviewer's questions influenced the child in her consciousness of what it meant to count.

Through thinking and reflecting, the child must learn. Teachers must see to it that the children have experiences where they use their capacity to think and must create situations where children are challenged. Developing activities which hinge onto the child's out of school experiences could be beneficial. But firstly teachers need to come to know what those experiences are.

Donaldson[28] has seen that children can think at more advanced levels if the problem has to do with the children's world. She refers to how children solve Piaget's "mountain test" which seeks to determine how children see things from perspectives different from their own. The children are given a three dimensional model of three mountains. It is placed in front of them and they are asked to choose the picture (from three) which shows how the mountain looks from the side opposite them. Children under six often choose the picture which shows the mountain from their own point of view. Piaget interpreted this to mean that children are egocentric and lack the capacity to see things from another person's perspective. Donaldson broadened this interpretation by seeking information using a whole different set of concepts. Here the child is given a model with four roads which make a cross shape, where a thief could come where he would not be seen by the police. In this test approximately 90% of the children between 3 1/2 and 5 years solved the problem and showed they could see another perspective, i. e. the policeman's perspective. That children in this situation could clearly work with the problem depended, according to Donaldson, on the police-thief situation which was familiar and part of every day life for all the children.

Discussion

All adults have learned that Newton discovered that an apple falling from a tree depended not on the fact that it was heavier than air, but because of the earth's force of gravity. This is the representation based on scientific knowledge. Although we all know that, there is some inner sense that represents the apple's fall as dependent on how heavy it is. The latter representation is an everyday representation which we have created through our experience.

School world and everyday world

Studies[29] show that one acquires a scientific thinking pattern in school as a form of comprehension which applies to the school's world. Often, however, one has eradicated everyday representations which one has met in another way. This implies that one can sometimes receive conflicting interpretations of a phenomenon. School is a world in which children learn that certain things are valid only there i.e. that one does not learn how to live outside of school. Maybe there is a clash between everyday representations and scholarly ones. In any case, children often do not have an opportunity to tie together the things they have learned in school with things in their own "world".

If everyday representations and school representations are to be integrated in a single understanding, we must begin early in the pre-school and primary school. Children must gain experiences in education which are relevant even for their lives outside of school. Children have many experiences of everyday situations, but if these experiences are to develop to knowledge and understanding, then children must get the help and be given the opportunities they need to reflect on their experiences.

To illustrate the disintegration of life in and out of school we can imagine a pre-school child who eats breakfast at her pre-school. In a bowl on the table are slices of tomato. When breakfast is over, the

teacher and the group of children go to their little "corner" to have a conversation and are told that that day they will go to buy some vegetables. The tomatoes which had been taken away were discussed and talked about. It is not strange if children begin to doubt if they learn anything in pre-school which has something to do with their own "world". Why not use breakfast time to teach children about tomatoes? We need to develop the sensitivity and skill to deal with mathematics, English, etc. in relation to the children's experiences, so children can relate what they learn in school to their own "world?"

We said earlier that children possess a great capacity to solve problems if they are tied to their own experiences, which is perhaps the single reason why the child understands what it is about. We have widely declared that children find it easier to express and describe their thoughts if the questions which are asked are relevant to their own experiences.

Children's spontaneous questions

Children ask many questions. The questions they ask can at times cause adults to be amazed and may range from the smallest trivialities to philosophical speculations. When children ask adults questions, the best starting point for the adults if they are to engage in a one-to-one dialogue with the children, is discussing the children's disclosures. What is it the child really wants to know when they ask a question? Let us look at Mirjam who questioned her teacher in the following way:

Mirjam: *How did the first man arise Miss?*

Teacher: *What, arise. . .?*

Mirjam: *How did they begin to grow?*

Teacher: *We don't really know. Some people think that man developed from the apes, while others believe that they have been created.*

Mirjam: *That isn't so.*

Teacher: *How do you believe they have arisen?*

Mirjam: *From an egg.*

Teacher: *Why from an egg?*

Mirjam: *A hen's egg (laughs). A grass man came out who later developed into a real man. The first men were stone age men.*

(After a long discussion about stone age men and what people know about them, Mirjam says:)

Mirjam: *I don't want to answer your questions.*

Teacher: *But you are asking me a lot..*

Mirjam: *Yes, but you did not answer my question about how the first men arose?*

Teacher: *Yes, I don't know for sure, but I think that people developed from apes.*

Mirjam: *Then I was right when I thought there were many ape men who became stone age people.*

At first glance, Mirjam's question was a representation of deep thought about the development of mankind. But as the conversation continued, we saw that she already had a clear idea that people had grown from an egg and had then become ape people and stone age people. This was really only an idea which she wanted to have confirmed, she was not susceptible to any other idea. It is easy for adults to impose all their knowledge on what the children ask, but the child's questions are frequently asked in a way and at such a level that the children cannot understand the adult's explanations. Naturally one should answer questions which the children ask, and it is rewarding to find out what the children are really asking. The children's spontaneous questions disclose their thinking in a natural way.

Now of course there is much that one can learn through children's spontaneous pondering as they experience many things. We often hear from teachers who believe that children can think much more than they can express. However, we are not attempting to decipher the connection between speech and thought, because that is one of the fundamental problems of psychology, where there are many conflicts of opinion. We do feel though that children have different capacities to express themselves verbally and that they neither spontaneously search after nor are in a condition to communicate

their whole world of thought. We also believe that *when a child cannot express their thoughts about something, it often depends on the fact that they have not had opportunities to reflect on these thoughts earlier*, or that maybe they have not been given *time or help to do so*. We saw in an earlier chapter how a child could connect counting with shopping. This child had depended on her mother to do it, and the child never needed to think about how it was done.

Children think about many phenomena spontaneously and these we ought to naturally use both to *learn something about the children and to teach children something*. There are, however, many things which we adults have determined as important for children to learn. Teachers must guide the child's thoughts about these concepts, principles, and ideas.

The role of the teacher

In order to understand children, we must understand how children think. Teachers must understand that even in what superficially seems to be a homogeneous children's group, there are many *different* levels of thought and this knowledge must be used when one teaches them. From the teacher's point of view, it may seem that one response is more correct than another, but teachers must try to understand *the child's perspective* and then go beyond whether something is right or wrong. All types of thinking are logical and obvious if one views them within the experiences the children have. To take their situation and to help children think about incidents from their lives is wonderful. Likewise it is natural that there is a point when children comprehend something and that something becomes obvious to them. Children often consider things from one point of view because they do not have the developmental capacity to see the relativity in existence.

Teachers also consider the influence of the child's environment to be obvious at times. However, this is not because they have not achieved relativity but because their jobs as teachers have become an everyday reality. Teachers have themselves been children who have gone to school and even to pre-school. Then they have narrowed their appreciation of broader issues through training to

become a teacher. Finally they have been socialized to be a "good" teacher out in school[30].

To become clear about their own "understanding processes" implies that one must struggle over a particular concept until it becomes obvious. It is difficult, sometimes almost impossible, to become clear while remaining alone. But through listening to how children have understood what one has said or done, one automatically gets a response to one's matter of course.

When one engages in interaction with a someone, it quickly becomes evident if one has different "knowledge grasping levels". If, on the other hand, teachers have a huge group of children, this diversity of knowledge levels is often concealed. When communication is coupled with "knowledge level understanding", the teacher can assure herself that she has made her own "knowledge grasping levels" visible to the children.

The teacher's task is to influence the children's thought development but it by no means helps to tell a child to think in another way. The children must accomplish this for themselves. For example, if a child has a heavy piece of wood that sinks and a light piece that floats, it is easy to arrange another experiment where what appears to be obvious to the child is not the way the objects behave. Children learn through concrete situations, but the concepts are not obvious unless the experience is followed up. The teacher must ask questions and observe what children do. Through their own experiences and activities they must learn the consequences of things.

Piaget[31] points out that children with different types of problem solving abilities first observe the *result* which happen and then reflect over the *process*, i. e. over how something happens. Thus, when children have a reading task, as a teacher one must offer them the opportunity to first describe and then reflect over what they have read. As earlier, where we pointed out that when one result exists one ought to help the children observe "why something behaves as it does" by looking at conflicting events to broaden their reflections, and this also applies to reading.

Something which ought to be used more and is being used today, is to give pre-school children the task of teaching another child

something. When one can demonstrate or clarify something for somebody else, it implies that one is forced to think about what one should teach. If the child itself does not understand, this often becomes obvious when they attempt to teach something to somebody else[6]. To give children problems which are challenging for the children's thinking is one role which the teacher has. Another way to receive and hold on to the child's thoughts. These two aspects of the teacher's work go hand in hand with each another.

Issacs[32] describes in her book on children's intellectual development a situation in one pre-school which we want to present here:

A teacher and her group of children come to the pre-school on a Monday morning. In the rabbit hutch, a rabbit lay on the floor. The children began to think about whether the rabbit is dead or only asleep. One child bursts out: "My dad said that if an animal is dead it will float in water." The teacher puts water in a bowl. The rabbit floats. Then the children asked new questions like: "What did it die of? Did it starve to death? Did we forget to fill its tray with food?" etc. The teacher and children decide that they should find out if the rabbit did starve to death. They discuss the rabbit with great interest. The children discover that the fur coat and the rabbit's skin have the same pattern. They discover how all of the intestines look. Lastly they look at the stomach and open it up. There they find masses of leftover food so they know that the rabbit did not starve to death. They pick the rabbit up and bury it in the ground. Time passed. One morning a child said suddenly: "Has the rabbit travelled up to heaven now". "No, it hasn't," said another child. A far-reaching conversation arose. Together with the teacher they decide that they want to know what happened to the rabbit. Together they go out to the grave and see the rabbit lying there. "But maybe the soul is in heaven. . ."

This example shows how *one* teacher used her role to help children develop their intellectual capacity with great understanding for the world in which they live. Perhaps this episode seems barbaric for the Swedish pre-school where one is not often allowed to have animals, and people think that dissection is strange. There are however many similar situations which arise every day, where

adults can help children find answers to their questions and which likewise support their development.

In the primary school in the 1980's, the following happened: Egil worked through a lesson in the mathematics book which asked him to learn to write numbers in words. Later he had a test which had these instructions: "Write the following numerals in words" 825, 3201, 10236 etc." Egil wrote: eight-hundred-twenty-six, three-thousand-two-hundred-two, ten-thousand-two-hundred-thirty-seven, etc. When Egil got the test back, it had a red mark by every number. Can this be construed to mean that his thinking had failed? Is Egil's thinking wrong? Or is it perhaps the teacher who was wrong? If we free ourselves from the idea that something must be either right or wrong, then we should use this as example for a discussion about the role of the teacher.

We believe that only the individual teacher herself can determine what she should do about her understanding and knowledge about children's thinking. But if the teacher understood how Egil had interpreted "following numeral" in the above example, it becomes a delicate question whether she should not, in this case, give the child credit for a right answer.

Understanding how children think through their responses to questions provides the starting point for the role of a teacher which takes its starting point in the children's perspective, and hopefully can come to place the child and his/her development in focus. One can perhaps receive further food for thought through noting what Beth said when she met her speech therapist one afternoon:

Therapist: *Now, Beth, have you learned anything in school today?*

Beth: *No, today I have not learned anything at all, because the teacher talked the whole day.*

Evaluating

Teachers need to evaluate their work. This evaluation can be done in many ways. One way which we recommend is interviewing children after the completion of each section of work to gain a

picture of how the children have comprehended the instructions. This is different to the established way of evaluating, where the teachers evaluate what is a right or wrong answer, and instead looks firmly at the qualitative aspects of the answer. In the different chapters we have given examples of the qualitatively different answers which children give and which can in their turn give teachers an understanding of how children comprehend their surrounding world. A prerequisite for knowing the differences that exist is that we question children and accept that they have qualitative differences in thinking. When one accepts this, there are then many possibilities for being sensitive to the information one receives from everyday situations in the pre-school and primary school.

Because of the importance of this, one should keep in mind that a valid evaluation, whatever the children's comprehension of certain material or subjects etc., is the expression of the children's logic; i. e. children are always logical from their own experimental base. Children often react if they recognize something they know and is obvious to them. They can concentrate on part of a situation and understand a part which stands out from the whole. Adults consider children illogical because adults and children do not have the same logical processes. Children's thinking is not "inferior" to that of adults, but they do think differently.

To systematically evaluate becomes impossible if piece-meal approaches are used in the pre-school, leisure centre and primary school. There should be consistency here and we recommend interviews to ensure that consistency. In the pre-school and the leisure centre there are many adults who can go through the interview process. In the primary school there are not so many adults, but there are outside persons who are specialists who can help in this regard. Perhaps one does not even need to interview every child after every unit of teaching. Themes in the pre-school often only extend over short time periods. Perhaps it is sufficient to interview a selection of children after each unit rather than all of them.

The most important aspect of an evaluation in this form (interview) is that the teacher generates new knowledge, i. e. *teachers receive responses about their work from which they can build their*

knowledge of child development. When the teacher understands what and how children have understood what they work with, a starting point for continuation in their work may be established. The broader an understanding one has of children's thinking, the better one can work with children. To understand the relationship between one's own thoughts as a teacher and the children's comprehension of concepts is the nucleus of teaching.

Experiences which teachers have had with this form of evaluation can be illustrated as follows:

Ture: *I learned more about certain children in a 15 minute interview than I did through having the child in my group for a year and a half.*

Britta: *I came to know much about the child and not only what she had learned about the theme we had worked with.*

Ulla: *We discovered that we should have done some interviews about the topic also, for we waited so long that the children had a difficult time remembering what we had done in the beginning.*

Ebbe: *We described the interview evaluations which we had done for the parents and they became very interested and felt that we should do them regularly*

Ida: *We used what we had received from the interviews as a starting point for the parent conferences*

Eva: *I discovered that I should have been clearer about what I wanted to know from the interview and that I should have made up a few questions throughout.*

Lasse: *I realised afterwards that interviews should have been conducted in a private, partitioned place in the child care centre or when the remaining children were in the playground, for all the sounds from the other children were recorded on the tape and it*

was difficult to understand what the child said.

As we see from the foregoing statements, teachers have different experiences in interviewing their children. Certain teachers had thought that it would have been both difficult and tedious to interview children, so some we have come into contact with have been both positive and surprised about what they gained both for themselves as teachers and for children, especially as it applies to the children's world of thought.

Co-operating

The pre-school and the school have different criteria of effectiveness.[33] Not only do they have different traditions, but even their views of how children learn and develop are different. The basis for pre-school effectiveness and tradition rests on a mature theory first developed by Froebel[34] and later developed through the theories of Gesell[35]. This view implies that children develop through their own activity and through the teacher's creation of a stimulating environment.

The school's view is that children think in line with traditional learning theories[36] and learn to respond to the stimulus provided by the teacher for the children. The teachers pass knowledge onto the children, and whether the child can grasp this depends on their individual capacity. The child is seen as a passive individual to which the teacher transmit knowledge.

More recently there has been a change[18] regarding the theoretical base for pre-school effectivity. The traditional views of development have been distanced and a new viewpoint regarding children has grown forth from the interaction theories. With regard to intellectual development, the theories arose from the work of Jean Piaget. In relation to children's emotional development, the theories arose from the work of E.H. Erikson.

The point of view about children's development and learning which came from the Child Care Centre Official Investigation Report has come to influence later reports and analyses, even regarding the school's effectiveness. Today some guidelines for

both pre-school and school effectiveness are shared regarding the children's development and learning. The practical results, however, are still greatly influenced by the earlier traditions. As Wiechel[37] has observed, teachers from the two stages have different starting points for their judgements about children. Teachers in the school base their judgements on levels of intellectual capacity, while teachers in the pre-schools relate much to emotional difficulties.

Official aims must be developed in schools in relation to the practical everyday reality inside the different types of school. Arriving at a common goal for children may be no easy matter, and if children and their development are to be at the centre, then teachers have to think what are the similarities and differences in the children's levels of thinking which are related to concepts studied in pre-school and school, and must use the information which comes out of both levels. If the teachers become involved in interviewing their children about learning, mathematics, reading, outdoor exercise and play, time and space, etc., they could analyze these interviews on preparation days and together interpret and describe how children think about these content areas. This would be a wonderful opportunity for teachers to work together, to develop a spectrum of understanding about the children's world of thought and for reassigning mutually considered areas of responsibility.

What do pre-school children think about starting school? What can primary school children remember about starting school? These and similar questions could lead to co-operation where children of different levels could meet and confront each other's ideas. Many pre-school children are afraid of the "bigger" school children. Perhaps the pre-school children have heard the school children describe when they started school. The teachers at the different levels could learn a lot about their children through attempting to know the children's perspective and seeking to understand how children see their surrounding world.

From time to time we have heard from the leisure centre teachers that their children after a time in school have begun to lose interest after the children come to know that what they are doing is not what they expected, namely to write, read and count. This can be a

sign that there is a shortage of co-operation, which for the children causes them to relive experiences from pre-school.

Teachers must work with children from within their own needs and thoughts and not depend on information received through expectations stated by parents, colleagues, etc. Often the teachers in the pre-school do certain things with the children because they believe that the children's parents, or the teachers in the primary school, desire these things. In the primary school teachers believe that the middle primary school teachers have certain expectations. Our different expectations must be reassessed so that the children benefit. Placing the children first instead of living up to expectations implies that at every working moment we consider the child's needs first. This point is a guideline for pre-school as well as school.

Valid co-operation between pre-school and school, leisure centre and school or between parents and teachers is central to achieving this standard, but it is still in the early stages of development. There is some legislation, but as Randolph Norberg, pre-school and school committee secretary, said at a meeting in Göteborg in 1984, co-operation can never be achieved through legislation alone. Attitudes have to be addressed and positive attitudes developed.

Bärbel Inhelder, Piaget's long-time research colleague, said at a lecture in Geneva in the summer of 1983 that Piaget never concerned himself that much with the pedagogical consequences of his research, but one can clearly see three ways in which it has been used in the contexts we describe:

* One can use Piaget's research results to work out children's thinking patterns.
* As a foundation for planning appropriate levels of teaching in relation to the age of the children.
* To understand that it is important and useful to seriously consider children's understanding of their surrounding world and
* To work from the children's own creative capacity and continue from there, as Piaget has done.

Inhelder pointed out that she believed that the function which Piaget would have desired for his work was the third; i. e. that pedagogues would take his theories as guidelines rather than using a specific result.

We support Norberg and Inhelder's ideas and take them as the starting point for co-operation between the levels of school as well as between parents and teachers . The child and his/her world of thought must be central, which implies that we attempt to point out a guideline for thinking rather than suggesting a complete formula. The groundwork for this can be established on the basis of a solid understanding of children's thinking. This can be achieved by going through, analyzing, and drawing conclusions from interviews with children.

Perhaps this book can inspire and help teachers to try to understand how children think, so that their work with every child will improve. Understanding children involves more than just reading their writing. To attain it we believe one must go through a practical application of what we have accounted for here. We hope that all teachers will undertake this work joyfully. We promise excitement and informative discovery, and new, interesting, fertile and profitable teaching development.

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